

# Gold in the News

## Homogeneous Catalysis by Gold – A Hot New Paper!

Thompson ISIR, which provides the famous science citation index, has selected a paper from *Gold Bulletin* (2004, **37**, 51-65) as a “New Hot Paper”. Every two months, ISI Essential Science Indicators Web product lists a new crop of what it calls hot papers in science. Hot papers are selected by virtue of being cited among the top one-tenth of one percent (0.1%) in a current bimonthly period. Papers are selected in each of 22 fields of science and must be published within the last two years. The gold catalysis paper by Stephen Hashmi can be found at [http://www.goldbulletin.org/downloads/Hashmi\\_1\\_37.pdf](http://www.goldbulletin.org/downloads/Hashmi_1_37.pdf) and the Hot Topic report at <http://www.esi-topics.com/nhp/2006/january-06-AStephenKHashmi.html>

## Gold Nanorods Achieve Negative Refractive Index

Scientists have used gold to come a step closer to forming a material that has a negative refractive index within a visible spectrum of wavelengths. An international team that includes representatives from Manchester University in the UK, has provided details of a new metamaterial found to conduct electron clouds in the near-infrared range.

Gold nanorods between 100nm and 700nm long are arranged in parallel lines, and a light is shone that causes an electro-optical current. The electron clouds are seen to move together as if a single object at the 1.55m wavelength that is usually used for fiber-optic communications. The fact that this is possible in an optical range means a higher chance that optical images could be generated of objects smaller than the wavelength of light. This would be useful for fields such as communications and computing, as well as imaging in healthcare.

The Optical Society of America published the research in the journal *Optics Letters*.

## Umicore Makes Further Investment in China

Umicore has completed an acquisition which will enhance its presence in the Chinese market for brazing materials, including gold based alloys. It has signed an agreement to purchase the assets of the leading producer of brazing alloys in China, Zhenjiang Huanyu Xingchen Welding Materials Co. Ltd (Global Stars), based in Yangzhong, northwest of Shanghai. The acquisition will enable Umicore to strengthen

the global presence of its BrazeTec business and significantly improve its ability to serve the fast-growing Chinese brazing alloys market, which is already the largest market in Asia. The company will be fully integrated in Umicore’s worldwide Technical Materials and BrazeTec business network and operate under the name of Umicore Technical Materials Yangzhon. For further information see [http://www.investorrelations.umicore.com/en/pressReleases/2006/Yunnan\\_EN.pdf](http://www.investorrelations.umicore.com/en/pressReleases/2006/Yunnan_EN.pdf)

## Plasmonic Heating Using Gold

It is established that nanoscale particles of metals like gold can interact with light through plasmon resonance, even though they are much smaller than the wavelengths of visible light. The proportions of light that are absorbed and scattered vary with wavelength. In work published by Prof. Mike Cortie in the Proceedings of SPIE, The International Society for Optical Engineering (2005), it is proposed that the heating of the gold particles caused by light absorption, may potentially be exploited for solar glazing coatings, nanoscale lithography or medical treatments. The extent of the temperature rise in the particles will depend upon the value of the effective heat transfer coefficient between particle and environment. The latter is not known, but highly localized temperature rises of some tens of Celsius might be conceivable in systems illuminated by sunlight, the authors propose.

## Gold Used to Coat New Drug Delivery System

Researchers have used gold to coat a revolutionary new delivery system for medications and cell therapy. Scientists at Johns Hopkins have come up with a self-assembling perforated microcontainer that experts think could be deployed as a delivery system. Tests carried out showed that the hollow cubes can successfully carry and release microbeads and live cells typically used in medical treatment. The cube-shaped containers – which are no bigger than a speck of dust – were coated with gold to limit the danger of toxicity problems within the body. The metallic nature of the cubes will also allow the container’s location in the body to be easily tracked using resonance imaging. The microcontainers can be mass-produced harnessing basic chemistry and electronics techniques at a relatively low cost.

The test results are published in the December 2005 issue of *Biomedical Microdevices*.

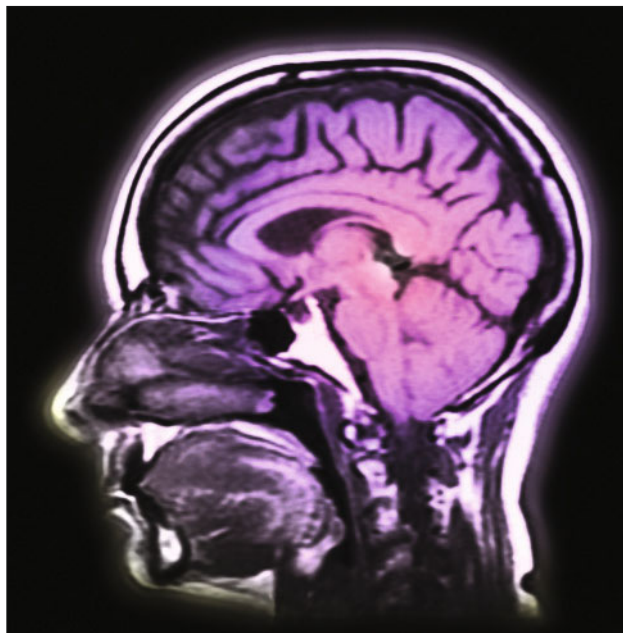
## Industrial Demand for Gold Up

GFMS Limited, the leading precious metals consultancy, specialising in research into the global gold, silver, platinum and palladium markets, released Gold Survey 2005 - Update 2 on the 19th January 2006, their latest report on the gold market. A summary of the findings of Update 2 was given by Philip Klapwijk, Executive Chairman of GFMS, at a seminar in Toronto. Industrial demand for gold rose by 2% in 2005, led by an improvement in electronics demand, particularly in the second half of the year.

## Optical Fibre Sensors Based on Vapochromic Gold Complexes

According to a recent study in the journal *Sensors and Actuators*, a new vapochromic material based on a gold-silver complex and diphenylacetyl, has been developed and used for the detection of some volatile organic compounds (VOCs). The basic material consists of a dark green powder, which when in the presence of VOC, changes in its optical properties. The sensor kits consists of an optical fibre onto which the vapochromic material is deposited. The behavior of the sensor has been studied for different concentrations of several types of VOC. Changes up to 2.5 dB in the reflected optical power were detected.

## Gold Nanoparticles and Radiation may slow Alzheimer's



There is currently no cure for Alzheimer's disease and its exact cause is unknown. The disease affects an estimated 4.5 million people in the United States alone, according to the National Institute on Ageing.

Now researchers in Chile and Spain have identified a new

approach for the possible treatment of Alzheimer's disease that they say has the potential to destroy beta-amyloid fibrils and plaque believed to contribute to the mental decline of Alzheimer's patients.

The researchers say the new technique, which they call a type of "molecular surgery," could halt or slow the disease's progress without harming healthy brain cells. The research is published in the January issue of the American Chemical Society's *Nano Letters*.

Using test tube studies, the scientists attached gold nanoparticles to a group of beta amyloid fibrils, incubated the resulting mixture for several days and then exposed it to weak microwave fields for several hours. The energy levels of the fields were six times smaller than that of conventional cell phones and unlikely to harm healthy cells, the researchers say. The fibrils subsequently dissolved and remained dissolved for at least one week after being irradiated, indicating that the treatment was not only effective at breaking up the fibrils but also resulted in a lower tendency of the proteins to re-aggregate, according to the researchers.

The same approach also holds promise for treating other neurodegenerative diseases that involve protein aggregation, including Parkinson's and Huntington's, says study leader Marcelo J. Kogan, of the University of Chile in Santiago. He says that the approach is similar to that of another experimental technique that uses gold nanoparticles to label and destroy cancer cells. Animal studies are now being planned.

For more information:

[http://www.eurekalert.org/pub\\_releases/2006-01/acs-gnr010406.php](http://www.eurekalert.org/pub_releases/2006-01/acs-gnr010406.php)

## Heavy-metal Ion Sensing Using Gold

In a recent issue of the the journal *Science and Technology of Advanced Materials*, a novel strategy for using Au nanoparticles capped with chitosan in sensing ions of heavy metals has been reported. A comparison of the optical absorption spectra of the colloidal gold suspension before and after exposure to metal ions is a good indicator of the concentration of the heavy metal ions. The technology may find potential application in industrial sensors.